# Five-Year Review Report

## First Five-Year Review Report
## for
## Tri-County/Elgin Landfills Site
## South Elgin
## Kane County, Illinois

**September 2004**

**PREPARED BY:**

**U.S. Army Corps of Engineers, Omaha District**
**Omaha, Nebraska**

**PREPARED FOR:**

**U.S. Environmental Protection Agency, Region 5**
**Chicago, Illinois**

Approved by:

Richard C Karl

Richard C. Karl, Director
Superfund Division
U.S. EPA, Region 5

Date:

9-23-04

# Five-Year Review Report
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## List of Acronyms

| | |
|---|---|
| AOC | Administrative Order on Consent |
| ARARs | Applicable or Relevant and Appropriate Requirements |
| BFI | Browning Ferris Industries of Illinois, Inc. |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| CFR | Code of Federal Regulations |
| ESD | Explanation of Significant Differences |
| HDPE | High Density Polyethylene |
| IEPA | Illinois Environmental Protection Agency |
| IPCB | Illinois Pollution Control Board |
| LDPE | Low Density Polyethylene |
| LFG | Landfill Gas |
| LLDPE | Linear Low-Density Polyethylene |
| NCP | National Contingency Plan |
| NPL | National Priorities List |
| O&M | Operation and Maintenance |
| PDI | Pre-Design Investigation |
| PRP | Potentially Responsible Party |
| QA | Quality Assurance |
| QAPP | Quality Assurance Project Plan |
| RA | Remedial Action |
| RAO | Remedial Action Objective |
| RCRA | Resource Conservation and Recovery Act |
| RD | Remedial Design |
| RI/FS | Remedial Investigation/Feasibility Study |
| ROD | Record of Decision |
| Site | Tri-County/Elgin Landfills site in South Elgin, Illinois |
| SVOC | Semi-Volatile Organic Compound |
| TBC | To-Be-Considered |
| TDS | Total Dissolved Solids |
| UAO | Unilateral Administrative Order |
| µg/L | micrograms per liter |
| USACE | U.S. Army Corps of Engineers |
| U.S. EPA | U.S. Environmental Protection Agency |
| VOC | Volatile Organic Compound |
| WDNR | Wisconsin Department of Natural Resources |
| WMI | Waste Management of Illinois, Inc. |

## Executive Summary

The remedy for the Tri-County/Elgin Landfills site in South Elgin, Illinois (herein after referred to as the Site) included excavation and consolidation of contaminated sediments under the landfill cap, construction of a landfill cap, active collection and treatment of landfill gases, long-term monitoring of the monitoring well network at the Site to assess contamination and effectiveness of the selected remedy, and institutional controls to limit land use. The Tri-County and Elgin Landfills achieved construction completion on September 30, 2000, and November 1, 2001, respectively. The triggering action date for this five-year review is the remedial action start of June 14, 1999.

The remedy at the Site is protective of human health and the environment, and exposure pathways that could result in unacceptable risks are being controlled as long as the institutional controls and operation and maintenance activities are maintained.

# Five-Year Review Summary Form

| SITE IDENTIFICATION | | |
|---|---|---|
| **Site name** *(from WasteLAN)*: **Tri-County/Elgin Landfills Site** | | |
| **EPA ID** *(from WasteLAN)*: **ILD 048 306 138; Spill ID # 052G** | | |
| **Region: 5** | **State: IL** | **City/County: South Elgin, Kane County** |

| SITE STATUS | |
|---|---|
| **NPL status:** ☒ **Final** ☐ Deleted ☐ Other (specify) | |
| **Remediation status** (choose all that apply): ☐ Under Construction ☒ **Operating** ☐ Complete | |
| **Multiple OUs?*** ☒ **YES** ☐ NO | **Construction completion date: Tri-County September 30, 2000; Elgin November 1, 2001.** |
| **Has site been put into reuse?** ☒ **YES** ☐ NO | |

| REVIEW STATUS | |
|---|---|
| **Lead agency:** ☒ **EPA** ☐ State ☐ Tribe ☐ Other Federal Agency _____ | |
| **Author name: Carrie Ables-Hamre / Mark Meacham / Brad Jones / Teresa Reinig** | |
| **Author title: Industrial Hygienist-Risk Assessor / Chemist / Geotechnical Engineer / Geologist** | **Author affiliation: U.S. Army Corps of Engineers** |
| **Review period:**** December 31, 2003 to September 2004 | |
| **Date(s) of site inspection:** March 15, 2004 | |
| **Type of review:**<br>☒ **Post-SARA** ☐ Pre-SARA ☐ NPL-Removal only<br>☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion | |
| **Review number:** ☒ **1 (first)** ☐ 2 (second) ☐ 3 (third) ☐ Other (specify) _____ | |
| **Triggering action:**<br>☒ **Actual RA Onsite Construction** ☐ Actual RA Start<br>☐ Construction Completion ☐ Previous Five-Year Review Report<br>☐ Other (specify) | |
| **Triggering action date** *(from WasteLAN)*: June 14, 1999 | |
| **Due date** *(five years after triggering action date)*: June 30, 2004 | |

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

# Five-Year Review Summary Form, cont'd.

**Issues:**

Cover soil slide along south Tri-County/Elgin interface
Tree cover over monitoring well 25-S
Annual reports need data review and validation as stated in the QAPP
Annual reports need to provide concentration maps for contaminants and natural attenuation parameters to aid in proving natural attenuation
Annual reports need to discuss the communication relationship between the shallow, intermediate, and deep aquifers

**Recommendations and Follow-up Actions:**

Continue to observe fixed geomembrane for sliding
The broken limb should be cut down that hangs over monitoring well MW-25S
The annual reports should have a data review and validation section as directed by the QAPP
Include concentration maps in the annual reports for the contaminants and the natural attenuation parameters
The annual reports should discuss the communication between the shallow, intermediate, and deep aquifers

**Protectiveness Statement:**

The remedy at the Site is protective of human health and the environment, and exposure pathways that could result in unacceptable risks are being controlled as long as the institutional controls and O&M activities are maintained.

**Other Comments:**

None.

**Tri-County/Elgin Landfills Site**
**South Elgin, Illinois**
**First Five-Year Review Report**

## I. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is or is expected to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and recommendations to address them.

The U.S. Army Corps of Engineers (USACE), as directed by the U.S. Environmental Protection Agency (U.S. EPA), is preparing this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action (RA) that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such RA no less often than each five years after the initiation of such RA to assure that human health and the environment are being protected by the RA being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The U.S. EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) §300.430(f)(4)(ii) states:

> *If a RA is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected RA.*

The USACE, Omaha District, for the U.S. EPA, Region 5, has conducted a five-year review of the RAs implemented at the Site. This review was conducted from December 31, 2003, to May 30, 2004. This report documents the results of the review.

This is the first five-year review for the Site. The triggering action for this review is the date of the remedial action start, as shown in the U.S. EPA's WasteLAN database: June 14, 1999.

## II. Site Chronology

### Table 1. Chronology of Site Events

| Event | Date |
|---|---|
| Waste Disposal Operations at Tri-County Landfill | 1968 - 1976 |
| Waste Disposal Operations at Elgin Landfill | 1961 - 1976 |
| Initial discovery of contamination | May 1971 |
| Cease and Desist Order – Illinois Pollution Control Board (IPCB) | April 12, 1973 |
| Site placed on National Priorities List (NPL) | March 31, 1989 |
| U.S. EPA Remedial Investigation/Feasibility Study (RI/FS) complete | July 24, 1992 |
| Record of Decision (ROD) signature | September 30, 1992 |
| Administrative Order on Consent (AOC) - Waste Management of Illinois, Inc. (WMI) and Browning Ferris Industries of Illinois, Inc. (BFI) | February 2, 1994 |
| Pre-Design Investigation Report complete | January 19, 1996 |
| Explanation of Significant Differences (ESD) - #1 | June 25, 1996 |
| Remedial Design (RD) complete | September 30, 1997 |
| ESD - #2 | April 23, 1998 |
| Unilateral Administrative Order (UAO) for RA issued – WMI and Tri-County Landfill Company | September 24, 1998 |
| UAO for RA issued to BFI | November 19, 1998 |
| Removal Action Work Plan/Notice of Authorization to Proceed with the RA | May 25, 1999 |
| AOC *de minimis* | June 11, 1999 |
| ESD - #3 | July 14, 1999 |
| UAO to BFI | November 3, 1999 |
| UAO to WMI and Tri-County Landfill Company | November 3, 1999 |
| Consent Decree for Settlement of Claims Against 26 Municipal Solid Waste Generators Entered in U.S. District Court | July 12, 2000 |
| RA complete: Tri-County Landfill | September 30, 2000 |
| ESD - #4 | July 3, 2001 |
| RA complete: Elgin Landfill | November 1, 2001 |

## III. Background

### III.A PHYSICAL CHARACTERISTICS

The Site encompasses both the Tri-County and Elgin Landfills. The Site is located in northeastern Illinois on the east side of Kane County near the triple junction of Kane, Cook, and DuPage counties. The Tri-County Landfill consists of approximately 46 acres and is an inactive landfill located approximately 2/3 of a mile southeast of the Village of South Elgin. The Elgin Landfill is approximately 20 acres and is located immediately adjacent to the northern boundary of the Tri-County Landfill.

On the west and southwest boundaries of the Site, the Tri-County and Elgin Landfill properties are enclosed by the Prairie Path, which is a former railroad right of way converted into a public bicycle footpath. The east and southeast site boundary is bordered by Route 25, along which several commercial businesses are located. The northern property boundary of the Elgin Landfill is bordered by agricultural land, and property owned by the Illinois Department of Conservation.

The land surrounding the Tri-County and Elgin Landfills to the north and to the east is used predominantly for agriculture. The Woodland Landfill occupies the land to the west of the Site. The Woodland Landfill is a sanitary landfill that was closed in November 2002.

Most of the residential properties in the vicinity of the Tri-County and Elgin Landfills are located in the Village of South Elgin, approximately 2/3 of a mile west of the Site, west of the Woodland Landfill. The residences nearest the Site are located along Dunham and Stearns Roads approximately 1000 feet southeast of the Site. A farmhouse is located approximately 1200 feet north of the Site. Other residences, most of which are single-family dwellings, are scattered throughout the area surrounding the Site. Many of the homes and businesses in the area of the landfills rely on their own private wells to provide drinking water and water for general use.

Surface water features in the area surrounding the Site include the Fox River, Brewster Creek, and unnamed tributary to Brewster Creek, and their associated wetlands. The Fox River is located approximately one mile to the west of the Site. Brewster Creek is a small, east to the west flowing stream located ½ of a mile south of the Site. The unnamed tributary to the Brewster Creek flows toward the Site from the east, bypasses the Site on the south side, and continues to flow south to discharge into Brewster Creek, which flows west into the Fox River.

### III.B LAND AND RESOURCES USE

The two adjacent landfills, Tri-County Landfill and the Elgin Landfill, supposedly had separate operations, although historical aerial photographs indicate that the two disposal operations overlapped, to the point where the two were indistinguishable.

In May 1971, the Elgin Jaycees, with the support of the Village of South Elgin and village residents, filed a complaint with the Illinois Pollution Control Board (IPCB). This Complaint

named the Tri-County Landfill Company and Elgin Landfill Company as respondents. The IPCB Complaint was initiated because of suspected surface water and ground water contamination.

On April 12, 1973, the IPCB ordered the respondents to "cease and desist the causing of water pollution and the threat of water pollution on their respective sites," and to pay specified penalties and post bonds. State records indicate that several lawsuits and appeals ensued involving both landfills subsequent to the IPCB decision, and that the landfills continued to operate during pendency of the litigation. Apparently, the landowners and operators never fully complied with all of the terms of the decision.

Prior to the 1940s, the Tri-County Landfill property was part of a gravel mining operation. Waste disposal at the Tri-County Landfill reportedly began in April 1968 and continued until December 1976. The Elgin-Wayne Disposal Company had initiated disposal operations at the landfill under a disposal permit issued by Kane County. During the period from 1968 to 1972, operations at the Tri-County Landfill were managed by the Elgin-Wayne Disposal Company. In 1970, the Tri-County Landfill Company (the actual owner of the property on record) was issued a permit by the Illinois Department of Health to operate the site as a solid waste disposal landfill (Permit 1970-DS-43).

Like the Tri-County Landfill, the Elgin Landfill property was also the site of a sand and gravel mining business that was operated by the Material Service Company until the late 1950s. Waste disposal operations began in 1961 under the name of the Elgin Landfill Company. No formal method of waste disposal was employed at the site and it appears that irregular areas were excavated, filled with waste and eventually covered. The Elgin Landfill originally operated under a permit issued by Kane County in 1961.

## III.C HISTORY OF CONTAMINATION

The Tri-County Landfill Company was issued an operational solid waste disposal permit by the Illinois Environmental Protection Agency (IEPA) in 1975 (Permit 1975-24-OP) and a supplemental permit was issued by the IEPA in 1976 (Supplemental Permit 1976/409). However, site operations continued under the management of the Elgin-Wayne Disposal Company until 1976.

The Kane County Building and Zoning Permit, originally issued in 1970, stated that landfilling was to occur in trenches. However, inspection records on file at the IEPA cite open dumping at the landfill and that the "area" method of landfilling was occasionally used. Background data suggests that waste was disposed of directly into the abandoned gravel quarry. Quantities and the specific nature of waste are not well known. Most of the dumping of liquid and industrial waste reportedly occurred at the Tri-County Landfill during the interval from 1968 to 1974. The ROD included a list of reported wastes and their estimated quantities that were accepted at the Tri-County Landfill. The locations of hazardous waste disposal in the landfill are not known. Typical problems reported at the landfill included: confined dumping, inadequate daily cover, blowing litter, fires, lack of access restrictions, and leachate flows.

Although the Tri-County landfill operations ceased in December of 1976, the existing cover was not emplaced until early 1981. Correspondence from the IEPA to WMI on April 14, 1981, indicated that the landfill had been satisfactorily closed and covered. The State did caution WMI that if problems relating to leachate, surface drainage or erosion were to develop in the future, they should be promptly corrected. Additional correspondence from the State of Illinois to Waste Management, Inc., through the end of 1981 cited erosion, ponding, and leachate problems occurring at the Tri-County Landfill.

Unlike the Tri-County Landfill, records detailing the amount and type of waste disposed in the Elgin Landfill either did not exist or were not available. Reportedly, primarily brush, residential and commercial rubbish, industrial waste and incinerator ash were disposed of at the landfill from 1961-1976. A summary of suspected waste streams disposed of into the Elgin Landfill was presented in the ROD.

## III.D INITIAL RESPONSE

On June 26, 1987, the potentially responsible parties (PRPs) were notified in writing of the opportunity to conduct a RI/FS under U.S. EPA supervision. RI/FS negotiations ended in February 1988, without an agreement having been reached with the PRPs. The Site was placed on the NPL under CERCLA on March 31, 1989.

The U.S. EPA conducted a RI/FS of the Site from April 1988 through July 1992 to define the nature and extent of contamination and evaluate alternatives for the cleanup of both landfills. The RI identified contamination in soil, sediment, and ground water, and determined that a primary pathway for the contaminants to migrate off-site is through rain and snowmelt infiltrating through the inadequate landfill cover, leaching contaminants from the landfilled materials, and transporting them to ground water and surface water by surface and subsurface flow. The U.S. EPA completed the RI/FS Report on July 24, 1992. The final RI/FS Report was approved on September 30, 1992.

On September 30, 1992, the U.S. EPA signed a ROD selecting a remedy for the Site with the concurrence of the IEPA. On February 2, 1994, the U.S. EPA entered into an AOC with WMI and BFI. Under this consent order, WMI and BFI agreed to perform the pre-design investigation (PDI) and RD activities at the site. The PDI Report was completed and approved by the U.S. EPA on January 19, 1996. The RD was completed and approved by the U.S. EPA on September 30, 1997.

### III.E. Basis for Taking Action

Hazardous substances that have been released at the site in each media include:

Soil
Arsenic
Beryllium
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Chrysene
Dibenz(a,h)anthracene
Indeno(1,2,3-c,d)pyrene
Aroclor-1242
Aroclor-1254

Sediment
Arsenic
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Chrysene
Dibenz(a,h)anthracene
Indeno(1,2,3-c,d)pyrene

Ground Water
Antimony
Arsenic
Barium
Chromium
Cobalt
Manganese
Thallium
Benzene
2-Butanone
1,2-Dichloroethene (total)
Tetrachloroethene
Trichloroethene
Vinyl Chloride
bis(2-Ethylhexyl)phthalate
1,4-Dichlorobenzene

Surface Water
Arsenic
Cobalt

## IV Remedial Actions

### IV.A Remedy Selection, Design, Modification, and Implementation

#### IV.A.1 Record of Decision

On September 30, 1992, the U.S. EPA signed a ROD selecting a remedy for the Site with the concurrence of the IEPA. The major components of the 1992 ROD included:

- Excavation and consolidation under the landfill cap of contaminated sediments that exceeded background levels;
- Construction of a landfill cover in compliance with Title 35, Illinois Solid and Special Waste Management Regulations, section 807.305 and Resource Conservation and Recovery Act (RCRA) Subtitle D cover requirements, as applicable;
- Collection, treatment, and disposal of leachate and contaminated ground water at the landfill perimeter, with natural attenuation of off-site, low-level ground water contamination, to ultimately comply with drinking water or health-based standards in all ground water outside of the waste boundaries;
- Active collection and treatment of landfill gases;

- Comprehensive monitoring program to ensure the effectiveness of the remedy;
- Institutional controls to limit land and ground water use; and
- Provisions for contingency measures to address new information or previously unknown problems, and flexibility on the type and timing of the ground water response component.

The estimated present worth of this remedy, as documented in the ROD, was $12,624,000, with the ground water component accounting for approximately $3,000,000 of that cost.

### IV.A.2 Administrative Order on Consent For Remedial Design

An AOC for RD was signed on February 2, 1994, with two PRPs: WMI and BFI. The AOC refined certain design elements of the landfill cap and set specific performance standards for the barrier layer. It also provided some design flexibility to ensure that performance standards were met. Under the AOC, the Respondents conducted and reported to the U.S. EPA on a Pre-Design Investigation (PDI), and then completed the RD. The purpose of the PDI was to acquire needed design parameters, determine background levels for soil and sediments, confirm hydrogeologic conditions, determine an appropriate period of attenuation for the off-site ground water and to ensure, through sampling, that residential wells were not being affected by the Site.

### IV.A.3 Explanation of Significant Differences - #1

Significant decreases in contaminants were observed in the analytical results obtained during the RI in 1990 and the PDI in 1995. The U.S. EPA signed an Explanation of Significant Differences (ESD) on June 25, 1996, due to the observed contaminant decreases.

These observations indicated that natural processes in the surficial aquifer were acting to attenuate the contamination within a short distance from the facility boundary. Natural attenuation processes include a combination of biological and chemical breakdown, dilution, and dispersion, and soil retardation. Contaminant reduction to concentrations below drinking water standards generally occurred despite the lack of an adequate final cover, and ground water and gas collection systems. Ground water monitoring and residential well sampling during the PDI confirmed RI findings that none of the downgradient ground water users were currently affected by contamination from the Tri-County Landfill, which includes both the Tri-County and Elgin landfills.

A computer aided infiltration model predicted an infiltration for the uniformly covered, well-maintained cap of 0.85 inches per year at the site. This reduction in infiltration significantly reduced the moisture available to generate leachate in the unsaturated zone, leading to reduced ground water contamination. Contaminant mass balance calculations were performed using data from both the RI and the PDI. The results predicted a 60 to 80 percent reduction in off-site contaminant concentrations within the first five years of remedy operation, based on reduced leachate generation associated with cap construction alone.

The U.S. EPA received a research paper developed by the Wisconsin Department of Natural Resources (WDNR). The research by WDNR supported the hypothesis that active gas collection has a beneficial effect on ground water contamination by creating an environment that promotes

mass transfer of contaminants from leachate to gas, which is subsequently extracted. The research suggested that this process may be beneficial at the Tri-County Landfill after construction of a cap and gas collection system.

The U.S. EPA believed the combined data from the RI and the PDI, supplemented independently by the work of the WDNR, strongly supported changing the leachate and water collection and treatment remedial components from an "up-front design and construction" element to a contingency element.
The ground water/leachate collection and treatment system was retained as a contingency element to address possible future site conditions that include, but are not limited to:

1. Failure of natural attenuation to bring to and maintain downgradient concentrations of site-related contaminants below the ground water performance standards set forth in the original ROD; or

2. Release of contamination at significantly higher concentrations than previously detected, which is a possible occurrence in any landfill where the precise contents were not historically documented and for which such documentation is beyond the scope of a typical CERCLA RI.

Such a determination will compare the long-term ground water monitoring results with chemical-specific Applicable or Relevant and Appropriate Requirements (ARARs) specified in the ROD, taking into account temporal trends in contaminant concentration and ground water flow. In addition, the U.S. EPA will consider the nature of land use in areas downgradient of the site that may be affected by any future release. At a minimum, the U.S. EPA will document its findings with respect to the effectiveness of the changed remedy with each five-year review for the site, as required by Section 121(c) of CERCLA. However, if conditions warrant it, the U.S. EPA may exercise the contingency at any time before or after a five-year interval.

IEPA's position is that the chemical-specific ARARs established in the ROD must be achieved at the landfill boundary (edge of the cap) by the time of the first five year review.

The first five years of remedy operation will be completed in 2006, five years after the 2001 remedy construction completion. Therefore, the determinations of whether the remedy's contingency element is needed and whether chemical-specific ARARs are achieved at the landfill's boundary are not being made at this time. These determinations will likely be made by the time the next five year review is completed in 2009.

### IV.A.4 Remedial Design

On September 30, 1997, the U.S. EPA approved the final RD submitted by WMI and BFI. The RD included a landfill cap with different design specifications than those set forth in the ROD or AOC. The RD specified the use of synthetic materials for the cap, namely a 40-mil geomembrane for the barrier layer, a geonet drainage layer, a geotextile to protect the drainage layer, and approximately 18 inches of soil cover. On April 23, 1998, the U.S. EPA issued a second ESD to reflect different design and construction specifications. The second ESD outlined the U.S. EPA's rationale for approving the modified landfill cap design.

### IV.A.5 Explanation of Significant Differences - #2

On April 23, 1998, the U.S. EPA issued a second ESD to reflect changes in design and construction specifications for a landfill cap. The U.S. EPA determined that the modified landfill cap design, as approved in the RD, was the best approach for this site in meeting the performance standards in the ROD and AOC for low permeability of the barrier layer. The ROD required the construction of a low-permeability clay barrier layer a minimum of 24 inches thick, covered with a layer of topsoil at least 8 inches thick. The AOC required the barrier layer to be buried below the maximum frost depth in Kane County. The AOC also required the construction of a one-foot thick drainage layer directly above the clay barrier layer.

The design options in the AOC for the barrier layer were either to 1) add a frost-protective soil layer approximately 42 inches thick over the 24-inch barrier layer; or 2) use alternative barrier materials that are not subject to frost damage and, therefore, do not require a thick protective layer. The U.S. EPA determined that it was appropriate to substitute an alternative material - a 40 mil Low Density Polyethylene (LDPE) geomembrane - in place of the clay layer. Geomembranes are not subject to frost damage and, therefore, need not be buried below maximum frost depth. In addition, geomembranes have lower permeability than clay and require fewer truck trips to deliver the materials. The end result is a lower overall thickness for the cap system.

In this ESD, the U.S. EPA also determined that a "geonet" synthetic drainage layer should be substituted for a sand or gravel drainage layer because of its superior performance, comparable cost, and compatibility with the geomembrane.

### IV.A.6 Unilateral Administrative Orders for Remedial Action

The negotiations for an RA Consent Decree began on February 27, 1998, with a Special Notice Letter. The negotiations ended on September 24, 1998, when a UAO for RA was issued to WMI, and the Tri-County Landfill Company for the Tri-County Landfill. An additional UAO was issued to BFI on November 19, 1998, for the Elgin Landfill. The effective dates for the UAO to WMI and the Tri-County Landfill Company, and the UAO to BFI were synchronized.

### IV.A.7 Explanation of Significant Differences - #3

On July 14, 1999, a third ESD was signed that allowed for the use of a high strength, low-permeability asphalt cap for the Elgin Landfill and the Elgin-Wayne portion of the Tri-County landfill at the site. The purpose of the revised RD was to install a high strength, low-permeability (1 x 10-8 cm/sec) asphalt cover, which replaced the previously approved asphalt layer, the geosynthetics, and 18 inches of the general fill layer over the geosynthetics. The revised asphalt cap consists of two discreet layers. The first layer consists of 20-inches of granular base and subbase material, which was used to develop the design slopes for positive drainage. This layer is a minimum 20 inches thick and was compacted to at least 90% of modified Proctor maximum density or equivalent, without exception. The ESD also allowed for the use of surface material that already existed at the Site, if that existing material proved to be

acceptably impermeable as shown by proper testing. The final layer is a 4-inch thick combined modified asphalt binder and modified asphalt surface course of specially produced high-strength, low-permeability asphalt.

### IV.A.8 Amendments to Unilateral Administrative Orders

The U.S. EPA issued amended UAOs to WMI and BFI on November 3, 1999. BFI is responsible for implementing the design and RA on the Elgin Landfill Portion of the site. WMI and the Tri-County Landfill Company are responsible for implementing the design and RA on the Tri-County Landfill portion of the site, including the Elgin-Wayne Property, which is used as a Waste Management transfer station.

### IV.A.9 Explanation of Significant Differences - #4

The fourth ESD was issued on July 3, 2001, to account for the sale of the Elgin Landfill properties to BFI by the previous landowners. Therefore, BFI, the party responsible for implementing the RA on the Elgin Landfill portion of the site, will no longer need to implement a remedy that allows for on-going use of the site by existing businesses, as required by the ROD and modified by the third ESD issued on July 14, 1999.

## IV.B Description of the Current Remedy

### IV.B.1 General

WMI operates a recycling transfer facility, located adjacent to the southeast corner of the Elgin Landfill. An area approximately 4 acres in size, south and west of the transfer facility was paved with Modified Asphalt Technology for Waste Containment Facilities (MatCon®) pavement in 1998 to allow continued operation of the transfer facility. A tie-in detail was developed during design of the Elgin Landfill to connect MatCon® pavement to the Elgin Landfill cover system.

### IV.B.2 Final Cover System

#### IV.B.2.a Elgin Landfill

The Elgin Landfill cover system includes two cover "types", designated as Type A and B. The Type A cover contains a smooth geomembrane and non-woven geotextile. Type A cover is used over about 15 acres (79%) of the site where typical slopes do not exceed about 5 percent, and includes the soil/geosynthetic cover interface with MatCon® pavement discussed above. The "Type B" cover contains a textured geomembrane and geosynthetic composite drainage layer. Type B cover is used over about 4 acres (21%) of the site where slopes are 25 percent (1V on 4H) or steeper. These areas include side slopes on most of the northern property boundary, the east boundary, and the southwest boundary of the landfill. Type A and B cover systems vary only with respect to geosynthetic materials used to address stability concerns on steep slopes. There are no differences in soil types and thicknesses used in Type A and B covers.

From top to bottom, Type A and B cover systems consist of the following materials and layer thicknesses:

| Type A | Type B |
|---|---|
| Topsoil (6") | Topsoil (6") |
| Select Fill (12") | Select Fill (12") |
| Geotextile | Geosynthetic Drainage Layer |
| Geomembrane (smooth)* | Geomembrane (textured)* |
| Random Fill (6" minimum) | Random Fill (6" minimum) |

* Geomembrane consists of 40-mil Linear Low-Density Polyethylene (LLDPE)

### IV.B.2.b Tri-County Landfill

The Tri-County Landfill cover system includes two components, a geosynthetic cover system that covers approximately 90 percent of the site, and an area of MatCon® pavement consisting of approximately 4 acres. From top to bottom, the geosynthetic component consists of the following:

Topsoil (6")
Rooting Zone (12")
Geotextile
Geonet
Geomembrane (smooth)*

* Geomembrane consists of 40-mil LLDPE

As indicated above, Elgin and Tri-County Landfill geosynthetic covers have 18 inches of soil above all geosynthetic materials. The MatCon® component of the Tri-County Landfill consists of 4 inches of low-hydraulic conductivity bituminous pavement overlying 20-inches of granular base material (12-inches of aggregate base course overlying 8-inches of subbase). To monitor effectiveness of MatCon® pavement, a lysimeter was installed west of the WMI Recycling Facility. The lysimeter drains to a sump containing a 10-inch diameter High Density Polyethylene (HDPE) pipe used for detecting liquids. MatCon® pavement was installed in October 2001.

### IV.B.3 Surface Water Drainage

### IV.B.3.a Elgin Landfill

Surface run-off from the Elgin Landfill cover is collected by gravity drainage in two on-site detention ponds designated as the upper and lower detention ponds. Both ponds are located in the southeast portion of the site, with the upper pond approximately 1.3 acres in size and the lower pond approximately 1.4 acres in size. Surface water from the upper detention pond discharges to the improved ditch south of the Waste Management Recycling Facility through a 10-inch diameter High Density Polyethylene (HDPE) dual containment pipe. The pipe exiting

the upper pond discharges to a 10-inch diameter single HDPE pipe located in the existing anchor trench for the Tri-County Landfill located along the west and south edges of the existing MatCon® pavement. A dual containment pipe was selected to convey surface water from the upper pond to the existing anchor trench because the pipe in this area is below the geomembrane liner for the Elgin and Tri-County Landfill cover systems.

The lower detention pond functions to collect and detain surface run-off from the east and northeast areas of the site. The lower detention pond was created by enlarging the existing pond near the east end of the site. Surface water which collects in the lower pond is discharged to the existing ditch along the west side of Illinois Route (Highway) 25 through a 10-inch diameter HDPE pipe and riprap liner scour hole. The inlet invert elevation and pipe size were selected to prevent discharge from the lower pond from exceeding the capacity of the ditch along Illinois Route 25. The existing ditch has minimal capacity due to insufficient slope and the poor condition of the existing culvert beneath the entrance to WMI. Organic rich seed bank material was placed in the lower detention pond to promote growth of wetland vegetation. A photograph of the lower detention pond and discharge pipe is included in Attachment 4.

Landfill material was excavated and graded within the Elgin landfill property boundary to approximately balance cut and fill requirements, and to avoid surface water impacts to existing on-site tenants. In addition, landfill materials that were beyond property boundaries on the north and east sides of the site were relocated within limits of the final landfill cover.

### IV.B.3.b Tri-County Landfill

Surface water within the Tri-County Landfill is collected in perimeter and interior drainage swales, culverts beneath WMI site access roads, an oil-and-grit separator, and an infiltration basin located near the southwest corner of the site. Perimeter drainage swales function to capture and channel surface water runoff from the landfill, for deposition in the infiltration basin. Drainage swales follow the site perimeter around the west, north, and east site boundaries. The drainage swale along the south site boundary crossing the ARC Disposal Property was relocated north of the southern property line of the Tri-County Landfill. West of the ARC Disposal Property parking lot the swale jogs to the south in accordance with the original design drawings.

### IV.B.4 Landfill Gas Collection System

An active landfill gas (LFG) collection and removal system was installed on both Elgin and Tri-County Landfills in order to address requirements in the ROD. The function of the LFG collection and removal system is to provide effective LFG migration control and to prevent physical disruption of landfill cover components resulting from gas migration. The Elgin LFG collection system is connected to the Tri-County Landfill system via two HDPE header pipes (east and west) that are connected to the treatment facility located at the southwest corner of the Tri-County Landfill. LFG from both Elgin and Tri-County Landfills is treated to remove volatile organic compounds (VOCs) by combusting with a flare located on the Tri-County Landfill.

### IV.B.4.a Elgin Landfill

Nineteen LFG extraction wells are located within the Elgin Landfill. Wells are spaced approximately 200 feet apart along the west, north, and south perimeters and at a maximum spacing of 400 feet within the landfill interior. Based on the most recent quarterly site inspection conducted by Weaver Boos Consultants on May 26, 2004, percent methane noted in extraction wells varied from 0.0 in GWE08 to 33.8 in GWE11. Check valves that allow isolation of each system separate Elgin and Tri-County LFG systems. The west header pipe drains to condensate knock-out/lift station KS01 on the Tri-County Landfill. The west header pipe drains to condensate knock-out/lift station KSE01 on the Elgin Landfill.

To identify off-site release of methane, five LFG monitoring probes were installed around the perimeter of the Elgin Landfill, designated as GPE01 through GPE05. Gas monitoring probes are used to monitor potential off-site migration of LFG during construction and after final landfill closure. Based on the most recent quarterly site inspection conducted by Weaver Boos Consultants on May 26, 2004, no methane was detected in any LFG monitoring probes.

### IV.B.4.b Tri-County Landfill

Twenty-five gas extraction wells, designated GW-1 through GW-25, and three horizontal gas extraction trenches, designated GT-01 through GT-03, are located within the Tri-County Landfill. Wells are 8-inches in diameter, constructed of Schedule 80 PVC pipe. Horizontal extraction trenches are located beneath the WMI hauling company parking lot to avoid vertical wells within the parking area. Horizontal wells consist of 6-inch diameter HDPE perforated pipe placed above gravel. Three knock-out/lift stations were installed at engineered low points of the system to collect condensate that forms as gas cools in the header pipes. To identify off-site release of methane, four LFG monitoring probes were installed around the perimeter of the Tri-County Landfill.

Reference the Construction Completion Report for the Tri-County Landfill, prepared by Earth Tech, Inc., dated October 2000, for additional information regarding the Tri-County Landfill gas extraction system.

## IV.C General Operation and Maintenance (O&M) Requirements

### IV.C.1 Landfill Cover System

Weaver Boos Consultants performed the most recent quarterly inspection of the Elgin Landfill cover system in March 2004. The condition of perimeter fencing, gates and locks were reported as "fair" in the inspection report, due primarily from damage to fencing and gates resulting from fallen tree branches. Removal of tree branches and repair to sections of damaged fencing were noted in the inspection report as completed prior to publication of the report. The report stated the condition of north, west, and south landfill perimeter slopes was "good". Small areas of gully erosion were noted along the south perimeter slope. These areas were repaired and seeded. Additional areas of erosion along the north and west perimeter slopes were noted to be well vegetated. No repairs were performed in these areas as the report states these areas appear to

have stabilized from the previous inspection. The condition of the upper and lower detention ponds were noted to be "good" in the inspection report, with strong vegetation growth. Riprap was also determined to be in "good" condition. No mention was made in the inspection report of the condition of drainage structures and pipes. The report indicates that no signs of damage, vandalism, or unauthorized entry were observed during the inspection.

In the fall of 2001, a small slide occurred near the interface of the Tri-County and Elgin Landfills. The slide area was located south of the upper detention pond on the Elgin Landfill and west of MatCon® pavement surrounding the Waste Management Transfer Facility. The slide area was approximately 150 feet in length measured perpendicular to the slope direction and 15 feet in length measured in the direction of the slope. The slide began at the top of the slope. All parties have not agreed to the cause of the slide at the time of preparing this report.

From top to bottom, the Tri-County Landfill cover system consists of 18 inches of cover soil, non-woven geotextile, geonet, and geomembrane. The geomembrane consisted of 40-mil smooth Linear Low-Density Polyethylene (LLDPE).

The area was repaired in October 2001 by welding textured 40-mil LLDPE geomembrane to the existing smooth geomembrane in order to increase the interface shear strength between the geonet and geomembrane. The original idea for repairing the slide area was to weld 3 to 5-foot wide strips of textured geomembrane on approximate 15-foot centers. The repair was modified to cover the entire slide area with textured geomembrane because the underlying smooth geomembrane had been damaged while removing cover soil during repair operations. The slide area was revegetated in the spring of 2002, and no additional movement has been noted on subsequent quarterly inspection reports. A photograph of the revegetated area is shown in Attachment 4.

Quarterly inspections should continue to monitor the condition of the landfill cover system. Inspections should assess the condition of vegetation, perimeter slopes, riprap, drainage structures and pipes, and fencing to include gates. Any evidence of erosion, tension cracks or cover soil instability, or damage from burrowing animals should be noted for future repair. In addition, depressed areas on the landfill cover system that may pond water should be noted for future repair. The condition of the upper and lower detention ponds should be assessed with respect to wetland vegetation and condition of drainage structures and pipes.

A photograph looking west to east along the north perimeter slope, and an erosion gully along the west perimeter slope are included in Attachment 4.

### IV.C.2 Landfill Gas Collection System

### IV.C.2.a Elgin Landfill

In addition to the landfill cover system, Weaver Boos Consultants also inspected the gas collection system in March 2004. The inspection included gas extraction wells GWE01 through GWE19 located within the landfill perimeter; gas monitoring probes GPE01 through GPE05 installed along the north, east, and west perimeter slopes of the landfill; and cleanouts located

near extraction wells GWE14, GWE19, and near condensate knock-out/lift station KSE01. Extraction wells GWE09 and GWE11 were closed during the inspection due to high oxygen and low methane readings. During the inspection, no methane was detected from any of the gas monitoring probes (GPE01 through GPE05). The report states the condition of all extraction wells (GWE01 through GWE19), all monitoring probes (GPE01 through GPE05), and the knock-out/lift station (KSE01) as "good".

Annual inspections should continue to monitor the landfill gas collection system and make adjustments as necessary to ensure continued satisfactory operation of the system.

### IV.C.3 Long-Term Ground Water Monitoring

Ground water monitoring is performed on an annual basis for the Tri-County landfill and the Elgin landfill. USACE, Omaha District has performed quality assurance oversight during the annual ground water sampling event from 2000-2003. Ground water levels are measured on both landfills across the site on the same day to allow for mapping of ground water flow across both landfills. The monitoring wells that are sampled at each site are listed in Section VI of this report.

Monitoring wells are sampled using peristaltic pumps, dedicated bladder pumps, and non-dedicated Grundfos pumps. Low-flow sampling is employed during the annual ground water monitoring events, which includes the collection of field parameters to establish monitoring well stabilization.

Data generated from the 2002 monitoring event was reviewed in Section VI of this report.

## V. Progress Since the Last Review

This is the first five-year review for this Site.

## VI. Five-Year Review Process

### VI.A Administrative Components

The U.S. EPA is the lead agency for this five-year review. The support agency is the IEPA. IEPA, the PRPs WMI (Tri-County Landfill) and BFI (Elgin Landfill), and the PRPs' consultants were notified in early 2004 of the start of the five-year review.

The USACE performed most of the tasks required for the review for the U.S. EPA, under the authority of an interagency agreement. The review consisted of the following components:

- Community Notification and Involvement
- Document Review
- Data Review
- Site Inspection
- Five-Year Review Report Development and Review

## VI.B Community Notification and Involvement

A notice was published in the Elgin Courier News on May 31, 2004, stating that a five-year review was being conducted. The notice invited the public to submit comments to the U.S. EPA by June 7, 2004. No comments from the community were received by the U.S. EPA. The results of the review and this Five-Year Review Report will be placed in the site repository located at the Gail Borden Public Library, 270 N. Grove Avenue, Elgin Illinois 60120, and in the Superfund Records Center at the U.S. EPA Region 5 Office located at 77 W. Jackson Street, Chicago, Illinois 60604. A copy of the published notice can be found in Attachment 3.

## VI.C Document Review

The list of the documents that were reviewed for this five-year review can be found in Attachment 2.

## VI.D Data Review

An annual ground water sampling program has been performed at both of the landfills (Tri-County and Elgin) since 2000. USACE, Omaha District has provided quality assurance (QA) oversight during each of the sampling events since 2000.

As previously discussed in Section IV of this report, the analytical results of the PDI Report (January 19, 1996) and the RI facilitated a change in the ground water remedy as stated in the June 25, 1996, ESD #1. Therefore, the analytical results of the PDI were reviewed as the analytical baseline for the five-year review. The data generated during the last reported sampling event in 2002 was reviewed from each landfill to compare with the PDI results generated in 1995.

### VI.D.1 Private Wells

Four private wells are still sampled as part of the annual ground water sampling program on the Tri-County Landfill site. No private wells are sampled as part of the Elgin Landfill annual ground water sampling program. The four private wells sampled as part of the Tri-County sampling program are PW-7 (Woodland landfill), PW-9 (Chicago Stone), PW-22 (Waste Management building tap), and PW-23 (Waste Management repair bay tap).

### VI.D.1.a PDI Report (January 19, 1996)

The PDI reported only one of the four private wells with a VOC that exceeded regulatory standards. Benzene was detected at 9 micrograms per liter (µg/L) in PW-23. Other inorganic detections that exceeded regulatory limits were reported on page 2-22 of the report.

### VI.D.1.b Tri-County 2002 Ground Water Report

No VOCs were reported over the regulatory limits in any of the four private wells. Benzene was detected at 2 µg/L, which is below the regulatory standards in PW-23. Chloromethane was also detected at 3 µg/L in PW-23. No other VOCs were detected in the other three private wells.

For each of the inorganic results that were reported over the regulatory limits in the PDI, in 2002, the concentrations were reduced for every analyte except iron in PW-9 (390 to 650 µg/L) and total dissolved solids (TDS) in PW-22 (678 to 767 µg/L).

The reductions in the majority of the analyte concentrations supports the effectiveness of the RA and natural attenuation. Data should continue to be examined on an annual basis for persistent contaminants (such as iron and TDS) to ensure that no unacceptable migration is occurring.

### VI.D.2 Tri-County Landfill Wells

Twenty-six (26) wells make up the ground water monitoring network for the Tri-County Landfill site. The wells are installed at three depths: shallow, intermediate, and deep. The monitoring network is made of the following wells:

Shallow: MW1S, MW2SR, MW5SR, MW6S, MW10S, MW12SR, MW25S, MW38S, MW39S, MW41S, and G135.

Intermediate: MW1I1, MW1I2, MW2IR, MW5IR, MW6I, MW10I, MW12IR, MW13IR, and MW39I.

Deep: MW40DR, MW1DR, G112, and G142.

Piezometers: PZ29 and PZ32.

### VI.D.2.b PDI Report (January 19, 1996)

Benzene was detected in four (4) of the shallow ground water wells (MW2S, MW5S, MW12S, and MW41S) with a range of 10 to 100 µg/L. No organics were detected in the intermediate and deep ground water wells.

Aluminum, arsenic, chromium, iron, nickel, and manganese were detected above regulatory limits.

### VI.D.2.b Tri-County 2002 Ground Water Report

No VOCs were reported over the regulatory limits in any of the shallow, intermediate, and deep wells.

No semi-volatile organic compounds (SVOCs) were detected in any of the wells.

Only aluminum, arsenic, iron, and manganese exceeded regulatory limits for the inorganics analyses and chloride, nitrate, sulfate, and total dissolved solids for general chemistry parameters.

A comparison of the data between the PDI data (1996) and the 2002 monitoring data suggests that the general concentration trend for those contaminants is downward except significant concentration increases in manganese in MW-5S, manganese in MW-12S, chloride and total dissolved solids in MW-40D, and manganese in MW-41S.

Analytical detections from June 2002 that exceeded performance standards tables are available in Appendix A.

### VI.D.3 Elgin Landfill Wells

Nineteen (19) wells make up the ground water monitoring network for the Elgin landfill site. The wells are installed at three depths: shallow, intermediate, and deep. The monitoring network is made of the following wells:

Shallow: MW9S, MW20S, MW21S, MW24S, MW36S, MW37S, and G131.

Intermediate: MW9I, MW22I, MW23I, MW36I, MW38I, and G141.

Deep: MW9D, MW36D, MW-38D, and G111.

Piezometers: PZ33 and PZ35.

### VI.D.3.a PDI Report (January 19, 1996)

Benzene was detected in two (2) of the shallow ground water wells (MW20S and MW21S) with a range of 16 to 130 µg/L. Trichloroethene was detected in one (1) shallow ground water well at 8 µg/L.

Chrysene was detected in two (2) of the intermediate ground water wells (MW22I and MW23I).

No organics were detected in the deep ground water wells.

Aluminum, arsenic, chromium, iron, nickel, and manganese were detected above regulatory limits in the shallow monitoring wells.

Aluminum, chromium, and manganese were detected above regulatory limits in the intermediate monitoring wells.

Aluminum and manganese were detected above regulatory limits in the deep monitoring wells.

### VI.D.3.b Elgin 2002 Ground Water Report

No VOCs were reported over the regulatory limits in any of the shallow, intermediate, and deep wells.

No SVOCs were detected in any of the wells.

Aluminum, iron, manganese, nickel, nitrate/nitrite, and total dissolved solids were detected above regulatory limits in shallow monitoring wells.

Aluminum, arsenic, iron, manganese, nickel, chloride, and total dissolved solids were detected above regulatory limits in the intermediate monitoring wells.

Aluminum, iron, manganese, chloride, and total dissolved solids were detected above regulatory limits in deep monitoring wells.

A comparison of the data between the PDI data (1996) and the 2002 monitoring data suggests that the general concentration trend for those contaminants is downward except significant concentration increases in manganese in MW-36D, iron in MW-22I, chloride and total dissolved solids in MW-36I, and manganese in MW-38D.

Analytical detections from June 2002 that exceeded performance standards tables are available in Appendix B.

### VI.E Site Inspection

A site inspection was completed on March 15, 2004. The site inspection started with a meeting at the Waste Management building on-site at the Tri-County landfill, which involved the U.S. EPA Region 5, IEPA, the USACE Omaha District, Waste Management, Inc., and its contractors, and Browning Ferris Industries Waste Systems of North America, Inc., and its contractors. The attendance list is below:

| | |
|---|---|
| Michael Peterson | Waste Management – Closed Sites |
| Jay Corgiat | Environmental Information Logistics |
| Mary Pearson | Environmental Information Logistics |
| Rich Lange | Illinois Environmental Protection Agency |
| Greg Stewart | Weaver Boos |
| John Fagiolo | U.S. Environmental Protection Agency |
| Eric Ballenger | Allied Waste/BFI |
| Jim Hitzeroth | Allied Waste/BFI |
| Teresa Reinig | U.S. Army Corps of Engineers |
| Don Moses | U.S. Army Corps of Engineers |
| Mark Meacham | U.S. Army Corps of Engineers |

The meeting involved discussions of the five-year review process with the PRPs by the U.S. EPA, IEPA, and USACE, Omaha District. The Five-Year Review Site Inspection checklist,

which is Appendix D of the Comprehensive Five-Year Guidance produced by the U.S. EPA, was the basis for the meeting agenda. Each topic in the checklist was reviewed verbally by USACE, Omaha District with invitations for comments or concerns from the other parties in attendance.

After the review of the checklist was complete, the attendees performed a walkover of each landfill. Mr. Don Moses from the USACE, Omaha District led the group with discussions of the designs for each landfill and the functionality of the design. The landfills were checked to visually observe that they were operating as designed and to check for previously unseen problems. Pictures were taken by USACE, Omaha District that would aid in the description of the landfill conditions in this report.

The landfill covers were observed to be in good condition with adequate grass cover. A few minor erosion rills were observed and noted. Several repairs including an area recently revegetated due to the slide area between the Tri-County and Elgin Landfills and new piping on the Tri-County Landfill gas collection system were observed. MatCon® pavement was in good shape with no significant problems noted. Perimeter fencing was observed to be in good condition.

### VI.F Interviews

From 1997 to 2001, during the design and construction of the remedy, the community surrounding the site was given adequate opportunity to provide input into development of the remedy and express any concerns or questions about the site. Since the achievement of the last construction completion in 2001, there have been no major problems communicated to the regulatory agencies by the community. The need has not arisen for any community involvement events and the proximity of U.S. EPA's offices to the Site facilitates the agency's availability. Therefore, it was determined that no formal interviews with the community were necessary for this five-year review. No formal interviews with the agencies or PRPs were performed for this five-year review. As stated above in the Site Inspection section, all attendees were free to comment or raise concerns throughout the five-year checklist review and during the landfill walkovers. Communication has been maintained between the PRPs, USACE, Omaha District, U.S. EPA, and IEPA from the landfill design stage to the present time. Therefore, many informal interviews between the project team and the community have taken place over several years and formal interviews were not deemed necessary for this five-year review.

## VII Technical Assessment

### VII.A Question A: Is The Remedy Functioning As Intended By The Decision Documents?

Remedial Action Performance

The review of documents, ARARs, risk assumptions, and the results of the site inspection indicate that the remedy is functioning as intended by the ROD, as modified by the ESDs.

System Operations/O&M

Based on quarterly inspections and monitoring performed to date at the site, which includes both the Tri-county and Elgin landfills, the landfill cover system and gas collection system are functioning as intended by the ROD and other decision documents. When small problems arise such as methane detections in a monitoring well or water collecting in a landfill gas collection pipe, the problems have been corrected as shown in the photographs in Attachment 4. No significant problems have been observed with the landfill cover system or gas collection system. As a result, no significant future modifications are recommended for the landfill cover system or gas collection system at this time.

Opportunities for Optimization

There were no opportunities for system optimization observed during this review. If the remedy continues to operate as currently designed and constructed, one remedy aspect that could potentially be optimized would be the locations and frequency of sampling points for site monitoring. Opportunities for optimization will be re-assessed no later than the next five year review in 2009.

Implementation of Institutional Controls and Other Measures

The institutional controls that are in place include limitations on the disturbance of the landfills, any other activities or actions that might interfere with the implemented remedy, security fencing around both landfills with locked gates, and posted signs stating that these sites are Superfund sites and entrance is prohibited. No evidence was observed that suggested any violation of the institutional controls.

No formal legal deed restrictions have been implemented at the site as of the date of issuance for this initial five-year report. Discussions between interested parties are currently underway, and any decisions and implementation will be made by the second five-year report, to be issued in 2009. The re-use initiative is a special consideration for this site. Future decisions regarding re-use of the site will consider the requirement for the remedy to remain protective of human health and the environment.

Waste Management Industries operates a transfer facility located adjacent to the Tri-County Landfill, along Illinois Route 25. On-going activity at this facility will make it difficult for unauthorized personnel to access the site. In addition, Woodland Landfill located west of the Tri-County Landfill, is an operating municipal landfill facility. On-going activity at this facility will also discourage unauthorized personnel from accessing the Site.

Residential development on this Site is not consistent with current or projected land use patterns.

Long-Term Monitoring

Long-term monitoring of the monitoring well networks has been performed annually since 2000 under the supervision of the USACE, Omaha District for the U.S. EPA. No volatile organic or semivolatile organic analytes were detected above regulatory concentrations in the 2002 sampling event. Also, many of the metal concentrations in the 2002 sampling were less than that shown in the PDI Report of January 19, 1996. Comparison of the analytical results of the 2002 annual sampling event versus the analytical results produced from the PDI Report (January 19,

1996) suggest that the RA is effective. However, several metal concentrations exceeded regulatory limits. Inorganic constituents such as iron and manganese are typical in the anaerobic environments usually found at landfill sites. The current remedy selection may not decrease the observed inorganic contaminants below the regulatory limits, but decreasing trends should be observed as the landfill ages. Therefore, the current remedy should be closely monitored with respect to the observed contaminants and, if needed, a new or enhanced remedy may have to be considered.

## VII.B Question B: Are The Exposure Assumptions, Toxicity Data, Cleanup Levels, And Remedial Action Objectives (Raos) Used At The Time Of Remedy Selection Still Valid?

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy.

Changes in Standards and To-Be-Considereds (TBCs)
As the remedial work has been completed, most ARARs for ground water cited in the ROD have been met. There have been no changes in these ARARs and no new standards or TBCs affecting the protectiveness of the remedy.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics
The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures and potential future exposures for the recreational (child and adult), residential (child and adult), and occupational (adult only) populations. There have been no changes in the toxicity factors for the contaminants of concern that could affect the protectiveness of the remedy. These assumptions are considered to be conservative and reasonable in evaluating risk, and no changes are warranted.

Institutional controls such as site access control, site security, and deed and land use restrictions (as implemented) will ensure that exposure pathways at the site will remain protective of human health and the environment.

Changes in Risk Assessment Methods
There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

Expected Progress Towards Meeting RAOs
Although no remedy decision document issued by U.S. EPA defines the estimated remedy time period needed to achieve cleanup goals, it is possible that long term operation and maintenance at the site may continue until the year 2031. No formal estimates for the time requirement to achieve for remedy objectives have been made. For this site is it assumed that remedy objectives will be obtained in not more than 30 years from the date of the completion of remedy construction. So far, all site information indicates that the remedy is progressing as expected.

## VII.C Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

As indicated in the ROD, the Baseline Risk Assessment conducted during the RI/FS documents that releases of hazardous substances from the Site, if not addressed by the remedy, present an imminent and substantial endangerment to public health, welfare, and the environment. The Baseline Risk Assessment concluded that all of the remedial alternatives considered in the FS (except the "No Action" alternative) that addressed the risks to public health would also address ecological impacts. No other events have affected the protectiveness of the remedy and there is no other information that calls into question the short term and long term protectiveness of the remedy.

Currently, the Tri-County Landfill contains an operating WMI Transfer Facility. The presence of WMI personnel, site access control, and the Prairie Path to the west and southwest of the Site suggests that there may be site property re-use possibilities for the community that are more beneficial than traditional non-use requirements.

Future assessment of site conditions and decisions concerning the remedy should consider and incorporate current U.S. EPA property re-use initiatives and policies.

## VIII Issues

**Table 2. Issues**

| Issues | Affects Current Protectiveness (Y/N) | Affects Future Protectiveness (Y/N) |
|---|---|---|
| 1. Cover soil slide along south Tri-County/Elgin interface | N | N |
| 2. Erosion gullies along south, north, and west perimeter slopes | N | N |
| 3. Tree cover over monitoring well 25-S (Picture in Attachment 4) | N | N |
| 4. Annual reports need data review and validation as stated in the Quality Assurance Project Plan (QAPP) | N | N |
| 5. Annual reports need to provide concentration maps for contaminants and natural attenuation parameters to aid in proving natural attenuation | N | N |
| 6. Annual reports need to discuss the communication relationship between the shallow, intermediate, and deep aquifers | N | N |
| 7. Discussion/Decision on land use/Institutional Controls/Deed Restriction. | N | Y |

## IX Recommendations and Follow-up Actions

**Table 3. Recommendations and Follow-up Actions**

| Issue | Recommendations and Follow-up Actions | Party Responsible | Oversight Agency | Milestone Date | Affects Protectiveness (Y/N) | |
|---|---|---|---|---|---|---|
| | | | | | Current | Future |
| 1. Cover soil slide | Continue to observe fixed geomembrane for sliding | BFI | U.S. EPA and IEPA | June 2005 | N | N |
| 2. Erosion gullies | Continue to observe and repair active areas as necessary | BFI | U.S. EPA and IEPA | June 2005 | N | N |
| 3. Tree Cover | The broken limb should be cut down | WMI | U.S. EPA and IEPA | June 2004 | N | N |
| 4. Data Review/ Validation | The annual reports should have a data review and validation section as stated by the QAPP | BFI and WMI | U.S. EPA and IEPA | April 2005 | N | N |
| 5. Concentration Maps | Include concentration maps in the annual reports for the contaminants and the natural attenuation parameters | BFI and WMI | U.S. EPA and IEPA | April 2005 | N | N |
| 6. Aquifer Communication | The annual reports should discuss the communication between the shallow, intermediate, and deep aquifers | BFI and WMI | U.S. EPA and IEPA | April 2005 | N | N |
| 7. Discussion and Decision on land use and / or Institutional Controls and Deed Restrictions | Decisions on land use restrictions and/or institutional controls should be made by the second five-year review.<br>Re-use initiatives are to be considered. Site re-use can not endanger protection of human health and the environment. | BFI and WMI | U.S. EPA and IEPA | June 2009 | N | Y |

| Issue | Recommendations and Follow-up Actions | Party Responsible | Oversight Agency | Milestone Date | Affects Protectiveness (Y/N) | |
|---|---|---|---|---|---|---|
| | | | | | Current | Future |
| 8. Annual Monitoring Events | | | U.S. EPA and IEPA | Yearly until site closeout | N | N |
| 9. 2nd Five-Year Review (2009) | Continue to monitor the remedy | U.S. EPA | U.S. EPA and IEPA | June 2009 | N | N |
| 10. 3rd Five-Year Review (2014) | Continue to monitor the remedy | U.S. EPA | U.S. EPA and IEPA | June 2014 | N | N |
| 11. 4th Five-Year Review (2019) | Continue to monitor the remedy | U.S. EPA | U.S. EPA and IEPA | June 2019 | N | N |
| 12. 5th Five-Year Review (2024) | Continue to monitor the remedy | U.S. EPA | U.S. EPA and IEPA | June 2024 | N | N |
| 13. 6th Five-Year Review (2029) | Continue to monitor the remedy | U.S. EPA | U.S. EPA and IEPA | June 2029 | N | N |
| 14. Site Closeout | Not Applicable | U.S. EPA | U.S. EPA and IEPA | Sept. 2031 | N | N |

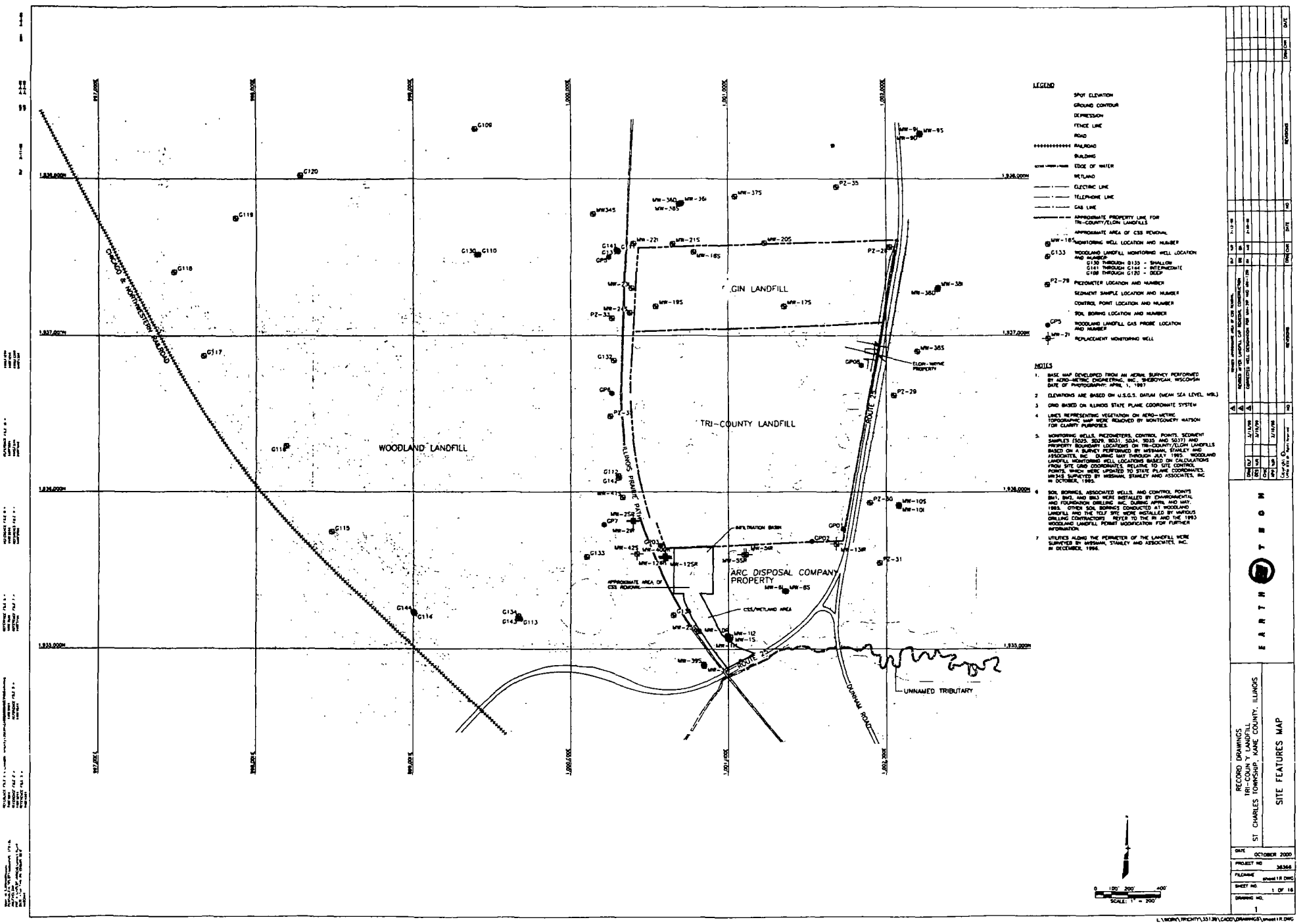
## X Protectiveness Statement

The remedy at the Site is expected to be protective of human health and the environment upon completion of the Remedial Action and, in the interim, exposure pathways that could result in unacceptable risks are being controlled as long as the institutional controls and O&M activities are maintained.

## XI Next Review

The next five-year review for the Site is required by September 2009, five years from the approval signature date of this report.

**Attachment 1**




RECORD DRAWINGS
TRI-COUNTY LANDFILL
ST CHARLES TOWNSHIP, KANE COUNTY, ILLINOIS

SITE FEATURES MAP

EARTH TECH

DATE: OCTOBER 2000
PROJECT NO: 36366
FILENAME: sheet1R.DWG
SHEET NO: 1 OF 16
DRAWING NO: 1

L:\WORK\TRICNTY\35136\CADD\DRAWINGS\sheet1R.DWG

**Attachment 2**

Browning-Ferris Industries of Illinois, Inc. and Waste Management of Illinois, Inc., Administrative Record Review for the Tri-County/Elgin Landfill National Priorities List Site, Golder Associates Inc., September 1992.

Montgomery Watson, "Tri-County/Elgin Landfills Predesign Report", 1996.

Record of Decision, Selected Remedial Alternative, Tri-County/Elgin Landfill Site, September 1992.

Terra Nova Resources Inc., "Annual Operation and Maintenance Report – Elgin Superfund Site", 2003.

USACE, Revised Design Analysis, Elgin Landfill, Tri-County/Elgin Landfills Superfund Site, June 2000.

USACE, Plans for Elgin Landfill Cover Redesign, July 2001.

U.S. EPA, "Record of Decision: Tri-County Landfill Co./Waste Management of Illinois, Inc.", EPA/ROD/R05-92/218, 1992.

U.S. EPA, Region 5, "Explanation of Significant Differences", Tri-County-Elgin Landfills Superfund Site, 1996.

U.S. EPA, Region 5, "Explanation of Significant Differences", Tri-County-Elgin Landfills Superfund Site, 1998.

U.S. EPA, Region 5, "Explanation of Significant Differences", Tri-County-Elgin Landfills Superfund Site, 1999.

U.S. EPA, Region 5, "Explanation of Significant Differences", Tri-County-Elgin Landfills Superfund Site, 2001.

U.S. EPA, Region 5, Final Remedial Investigation Report of the Tri-County and Elgin Landfills, Elgin, Illinois, WW Engineering & Science, July 24, 1992.

U.S. EPA, Region 5, Final Baseline Risk Assessment of the Tri-County and Elgin Landfills, Elgin, Illinois, WW Engineering & Science, July 24, 1992.

U.S. EPA, Region 5, Final Addendum Baseline Risk Assessment of the Tri-County and Elgin Landfills, Elgin, Illinois, WW Engineering & Science, August 10, 1992.

Waste Management, "2002 Groundwater Monitoring Report", April 2003.

**Attachment 3**

# EPA Conducting 5-Year Review of Tri-County/Elgin Landfill

The U.S. Environmental Protection Agency (EPA) is conducting a 5-Year review of clean up activities at the Tri-County/Elgin Landfill. This review will continue until June 12, 2004. The purpose of the review is to determine if the clean-up of the site has remained effective and no new problems have occurred.

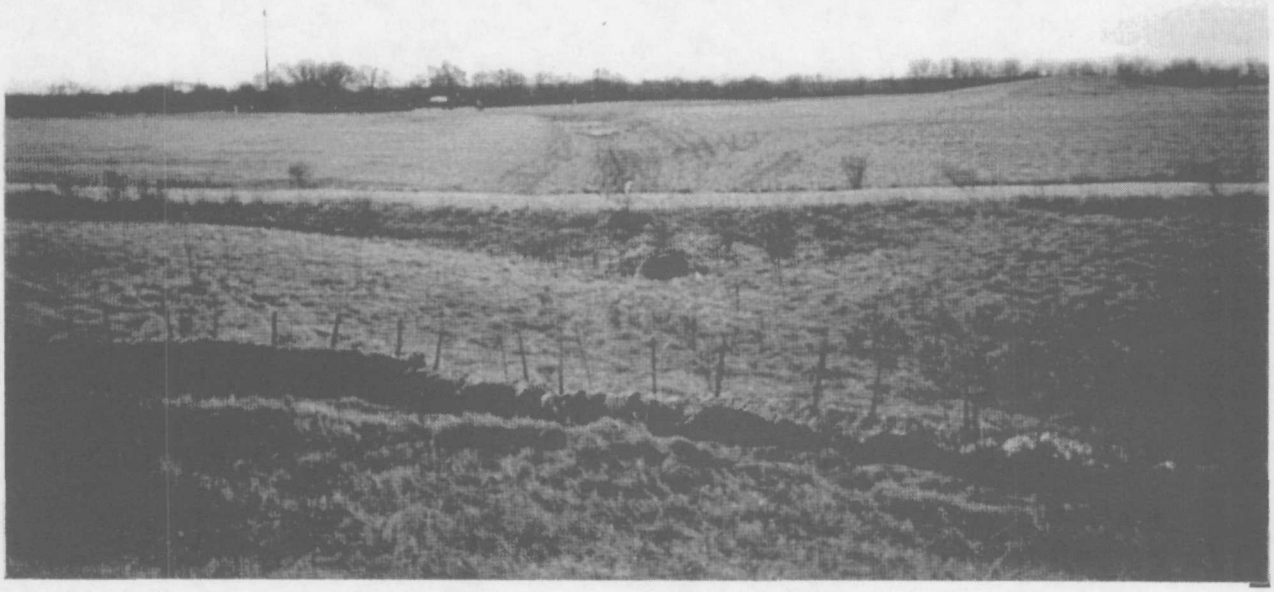
The site is composed of two adjacent areas used for waste disposal, the Tri-County and the Elgin landfills. These landfills encompass approximately 66 acres located 2/3 of a mile southeast of South Elgin. The landfills operated from 1968 until 1976. Although they were closed and covered when operations ceased, the protection eventually eroded. As a result, contamination ran off of the landfills and into the surrounding groundwater which flowed into Brewster Creek as well as the Fox River. The EPA cleaned up the area and properly capped both landfills as of June.1999.

The public is invited to comment on the current condition of the landfills. Written and oral comments must be submitted no later than June 7, 2004, and should be directed to:

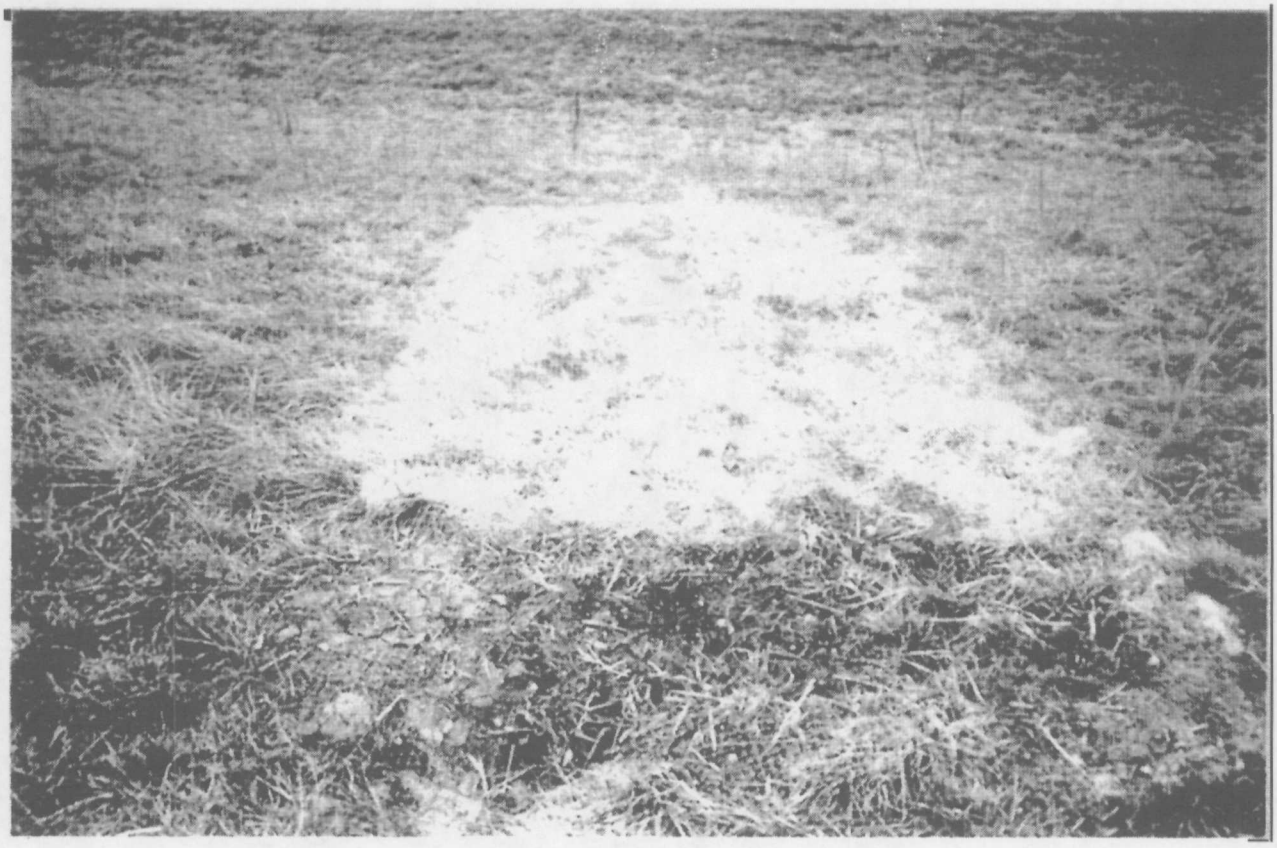
**Yolanda Bouchee-Cureton**
**Community Involvement Coordinator**
**U.S. Environmental Protection Agency**
**77 West Jackson Boulevard-P-19J**
**Chicago, Ill 60604**
**bouchee.yolanda@epa.gov/ (312) 353-3209**

**Attachment 4**

Lower Detection Pond and discharge pipe
(Elgin Landfill)



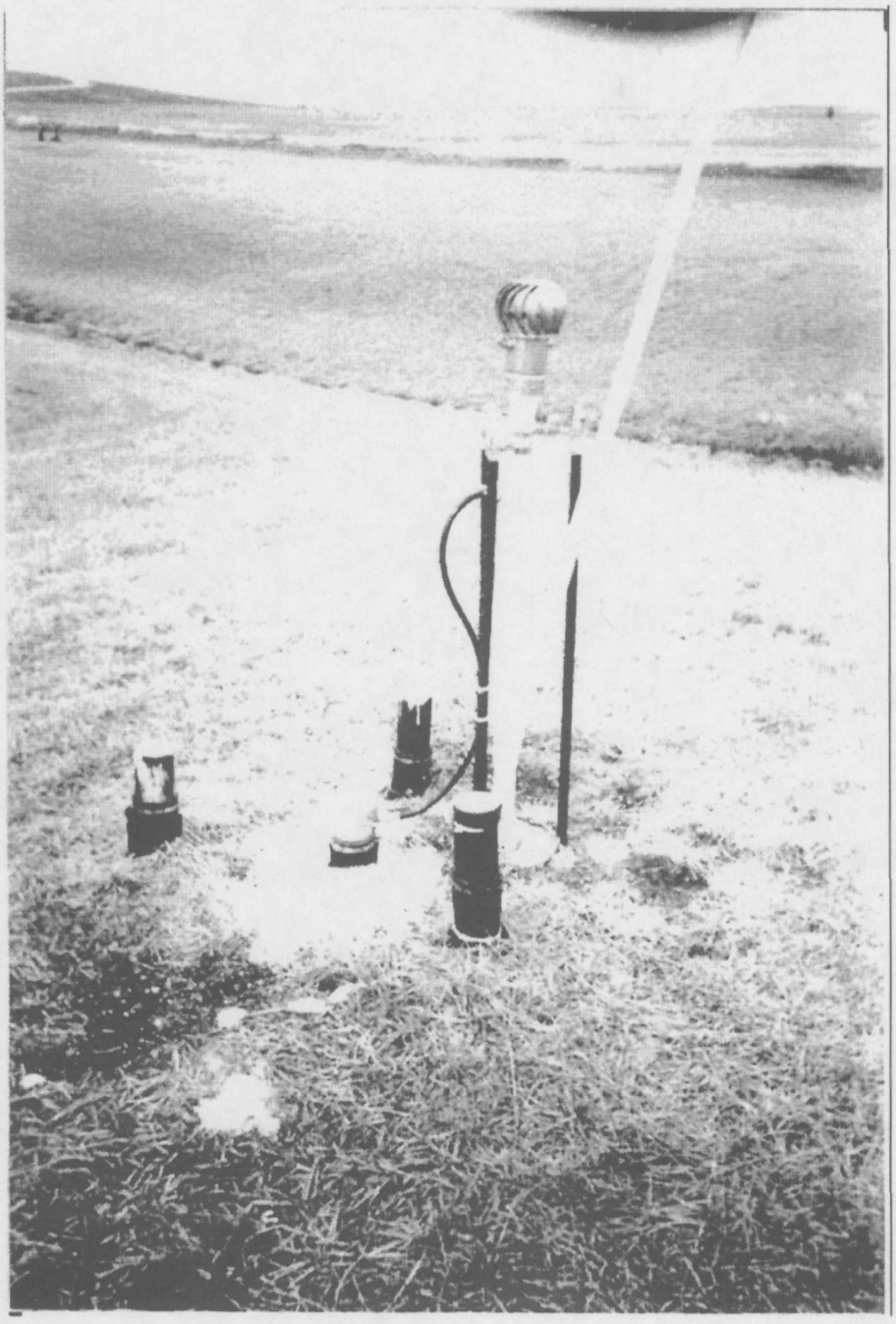
Drainage from Elgin Landfill onto Tri-County Landfill looking Southeast



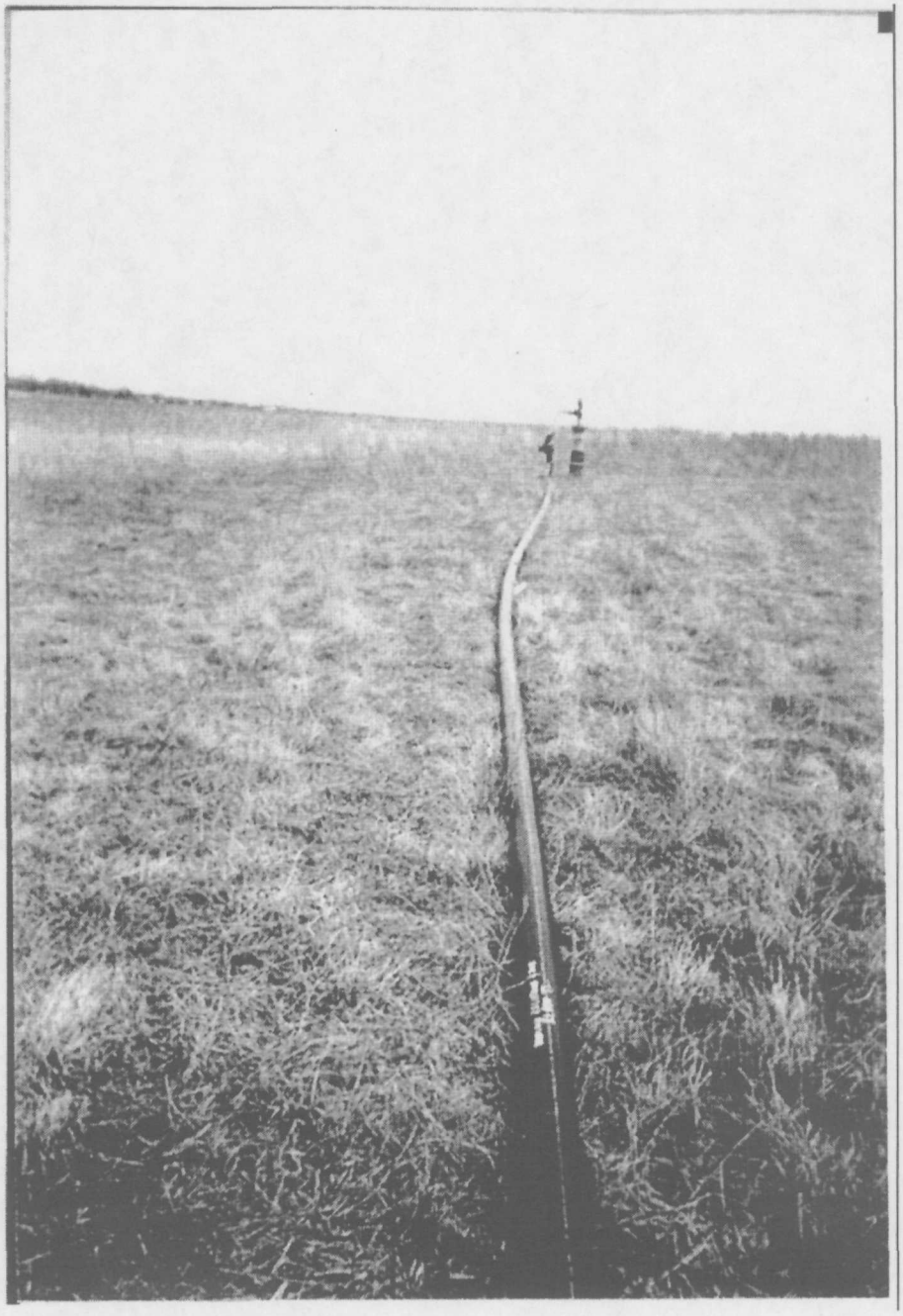
Tri-County/Elgin Slide – Revegetation Area

North Perimeter Slope
(Elgin Landfill)

West Slope Gully Erosion
(Elgin Landfill)



Monitoring Well Vent due to methane detections
(Tri-County Landfill)



New piping for landfill gas collection system
(Tri-County Landfill)

Tree hanging over monitoring well 25-S
(Tri-County Landfill)

# Appendix A

| Tri-County Landfill<br>Performance Standards Exceeded<br>April/May 2002 | | | | | | |
|---|---|---|---|---|---|---|
| **Sampling Location** | **Exceedance Parameters** | **Units** | **Analytical Results** | **EPA MCL** | **IL GW Quality Standards** | |
| | | | | | **Class I** | **Class II** |
| G112 | Dissolved Solids | µg/L | **696000** | 500000 | 1200000 | 1200000 |
| G135 | Dissolved Solids | µg/L | **691000** | 500000 | 1200000 | 1200000 |
| G142 | Chloride | µg/L | **621000** | 250000 | 200000 | 200000 |
| | Dissolved Solids | µg/L | **1920000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **6600** | 300 | 5000 | 5000 |
| MW-1S | Dissolved Solids | µg/L | **1100000** | 500000 | 1200000 | 1200000 |
| MW-1I1 | Dissolved Solids | µg/L | **566000** | 500000 | 1200000 | 1200000 |
| MW-1DR | Chloride | µg/L | **248000** | 250000 | 200000 | 200000 |
| | Dissolved Solids | µg/L | **1030000** | 500000 | 1200000 | 1200000 |
| MW-2SR | Aluminum | µg/L | **76** | 50 | | |
| | Dissolved Solids | µg/L | **1220000** | 500000 | 1200000 | 1200000 |
| | Manganese | µg/L | **100** | 50 | 150 | 10000 |
| | Nitrate | µg/L | **34000** | 10000 | 10000 | 100000 |
| MW-2IR | Aluminum | µg/L | **130** | 50 | | |
| | Iron | µg/L | **520** | 300 | 5000 | 5000 |
| MW-5SR | Dissolved Solids | µg/L | **579000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **2900** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **590** | 50 | 150 | 10000 |
| MW-5IR | Aluminum | µg/L | **220** | 50 | | |
| | Dissolved Solids | µg/L | **538000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **1800** | 300 | 5000 | 5000 |
| MW-6S | Chloride | µg/L | **248000** | 250000 | 200000 | 200000 |
| | Dissolved Solids | µg/L | **982000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **12900** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **200** | 50 | 150 | 10000 |
| MW-6I | Aluminum | µg/L | **800** | 50 | | |
| | Chloride | µg/L | **473000** | 250000 | 200000 | 200000 |
| | Dissolved Solids | µg/L | **1190000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **10800** | 300 | 5000 | 5000 |

| Tri-County Landfill<br>Performance Standards Exceeded (Continued)<br>April/May 2002 | | | | | | |
|---|---|---|---|---|---|---|
| **Sampling Location** | **Exceedance Parameters** | **Units** | **Analytical Results** | **EPA MCL** | **IL GW Quality Standards** | |
| | | | | | **Class I** | **Class II** |
| MW-6I (continued) | Manganese | µg/L | **93** | 50 | 150 | 10000 |
| MW-10S | Aluminum | µg/L | **55** | 50 | | |
| | Manganese | µg/L | **95** | 50 | 150 | 10000 |
| MW-10I | Aluminum | µg/L | **5500** | 50 | | |
| | Iron | µg/L | **3800** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **160** | 50 | 150 | 10000 |
| MW-12SR | Arsenic | µg/L | **20** | 10 | 50 | 200 |
| | Dissolved Solids | µg/L | **674000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **6400** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **340** | 50 | 150 | 10000 |
| MW-12IR | Chloride | µg/L | **318000** | 250000 | 200000 | 200000 |
| | Dissolved Solids | µg/L | **1310000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **3900** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **170** | 50 | 150 | 10000 |
| MW-13IR | Aluminum | µg/L | **91** | 50 | | |
| | Dissolved Solids | µg/L | **677000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **1700** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **75** | 50 | 150 | 10000 |
| MW-25S | Dissolved Solids | µg/L | **621000** | 500000 | 1200000 | 1200000 |
| MW-38S | Aluminum | µg/L | **50** | 50 | | |
| | Dissolved Solids | µg/L | **665000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **520** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **480** | 50 | 150 | 10000 |
| MW-39S | Aluminum | µg/L | **68** | 50 | | |
| | Dissolved Solids | µg/L | **700000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **310** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **910** | 50 | 150 | 10000 |
| MW-39I | Aluminum | µg/L | **290** | 50 | | |
| | Dissolved Solids | µg/L | **530000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **1200** | 300 | 5000 | 5000 |

| Tri-County Landfill<br>Performance Standards Exceeded (Continued)<br>April/May 2002 | | | | | | |
|---|---|---|---|---|---|---|
| **Sampling Location** | **Exceedance Parameters** | **Units** | **Analytical Results** | **EPA MCL** | **IL GW Quality Standards** | |
| | | | | | **Class I** | **Class II** |
| MW-39I (continued) | Manganese | µg/L | **180** | 50 | 150 | 10000 |
| MW-40DR | Aluminum | µg/L | **300** | 50 | | |
| | Chloride | µg/L | **481000** | 250000 | 200000 | 200000 |
| | Dissolved Solids | µg/L | **1220000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **2500** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **100** | 50 | 150 | 10000 |
| MW-41S | Dissolved Solids | µg/L | **1520000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **1800** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **930** | 50 | 150 | 10000 |
| | Nitrate | µg/L | **24800** | 10000 | 10000 | 100000 |
| | Sulfate | µg/L | **542000** | 500000 | 400000 | 400000 |
| PW07 | Dissolved Solids | µg/L | **925000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **3000** | 300 | 5000 | 5000 |
| PW09 | Iron | µg/L | **650** | 300 | 5000 | 5000 |
| PW22 | Chloride | µg/L | **201000** | 250000 | 200000 | 200000 |
| | Dissolved Solids | µg/L | **767000** | 500000 | 1200000 | 1200000 |
| | Iron | µg/L | **590** | 300 | 5000 | 5000 |
| PW23 | Iron | µg/L | **1800** | 300 | 5000 | 5000 |

# Appendix B

| Elgin Landfill<br>Performance Standards Exceeded<br>April/May 2002 | | | | | | |
|---|---|---|---|---|---|---|
| **Sampling Location** | **Exceedance Parameters** | **Units** | **Analytical Results** | **EPA MCL** | **IL GW Quality Standards** | |
| | | | | | **Class I** | **Class II** |
| MW-34S | Dissolved Solids | mg/L | **650** | 500 | 1200 | 1200 |
| | Aluminum | µg/L | **620** | 50 | | |
| | Iron | µg/L | **2800** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **170** | 50 | 150 | 10000 |
| | Nitrate/Nitrite[1] | mg/L | **8.4** | $10^2$<br>$1^3$ | $10^2$ | $100^2$ |
| MW-38I | Aluminum | µg/L | **160** | 50 | | |
| | Iron | µg/L | **1200** | 300 | 5000 | 5000 |
| G141 | Iron | µg/L | **3700** | 300 | 5000 | 5000 |
| MW-36D | Aluminum | µg/L | **110** | 50 | | |
| | Manganese | µg/L | **820** | 50 | 150 | 10000 |
| MW-23I | Chloride | mg/L | **470** | 250 | 200 | 200 |
| | Dissolved Solids | mg/L | **1600** | 500 | 1200 | 1200 |
| | Aluminum | µg/L | **200** | 50 | | |
| | Iron | µg/L | **3500** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **100** | 50 | 150 | 10000 |
| MW-23I Field Duplicate | Chloride | mg/L | **480** | 250 | 200 | 200 |
| | Dissolved Solids | mg/L | **1600** | 500 | 1200 | 1200 |
| | Aluminum | µg/L | **190** | 50 | | |
| | Iron | µg/L | **3500** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **100** | 50 | 150 | 10000 |
| MW-22I | Chloride | mg/L | **350** | 250 | 200 | 200 |
| | Dissolved Solids | mg/L | **1500** | 500 | 1200 | 1200 |
| | Aluminum | µg/L | **120** | 50 | | |
| | Arsenic | µg/L | **18** | 10 | 50 | 200 |
| | Iron | µg/L | **14000** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **110** | 50 | 150 | 10000 |
| G111 | Chloride | mg/L | **280** | 250 | 200 | 200 |
| | Dissolved Solids | mg/L | **1000** | 500 | 1200 | 1200 |
| | Aluminum | µg/L | **660** | 50 | | |
| | Iron | µg/L | **7400** | 300 | 5000 | 5000 |

| Elgin Landfill<br>Performance Standards Exceeded (Continued)<br>April/May 2002 | | | | | | |
|---|---|---|---|---|---|---|
| **Sampling Location** | **Exceedance Parameters** | **Units** | **Analytical Results** | **EPA MCL** | **IL GW Quality Standards** | |
| | | | | | **Class I** | **Class II** |
| G111 Field Duplicate | Chloride | mg/L | **270** | 250 | 200 | 200 |
| | Dissolved Solids | mg/L | **1100** | 500 | 1200 | 1200 |
| | Aluminum | µg/L | **610** | 50 | | |
| | Iron | µg/L | **7700** | 300 | 5000 | 5000 |
| MW-36I | Chloride | mg/L | **510** | 250 | 200 | 200 |
| | Dissolved Solids | mg/L | **1800** | 500 | 1200 | 1200 |
| | Aluminum | µg/L | **380** | 50 | | |
| | Iron | µg/L | **8800** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **350** | 50 | 150 | 10000 |
| | Nickel | µg/L | **210** | 100 | 100 | 2000 |
| MW-38D | Aluminum | µg/L | **100** | 50 | | |
| | Iron | µg/L | **2800** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **600** | 50 | 150 | 10000 |
| MW-9D | Iron | µg/L | **2500** | 300 | 5000 | 5000 |
| MW-9S | Dissolved Solids | mg/L | **510** | 500 | 1200 | 1200 |
| | Aluminum | µg/L | **92** | 50 | | |
| | Iron | µg/L | **620** | 300 | 5000 | 5000 |
| | Nitrate/Nitrite[1] | mg/L | **1.9** | $10^2$<br>$1^3$ | $10^2$ | $100^2$ |
| MW-24S | Dissolved Solids | mg/L | **900** | 500 | 1200 | 1200 |
| | Iron | µg/L | **570** | 300 | 5000 | 5000 |
| | Manganese | µg/L | **410** | 50 | 150 | 10000 |
| | Nickel | µg/L | **110** | 100 | 100 | 2000 |
| | Nitrate/Nitrite[1] | mg/L | **2.0** | $10^2$<br>$1^3$ | $10^2$ | $100^2$ |
| MW-9I | Dissolved Solids | mg/L | **540** | 500 | 1200 | 1200 |
| | Aluminum | µg/L | **240** | 50 | | |
| | Iron | µg/L | **820** | 300 | 5000 | 5000 |

Notes:
[1] Nitrate/nitrite analyzed in accordance with Sampling and Analysis Plan current as of the April/May 2002 monitoring event.
[2] Performance standards for Nitrate (as N).
[3] Performance standards for Nitrite (as N).